What is claimed is:

1 1.   A digital recording apparatus that obtains a digital

2 stream including a plurality of frames, while recording the

3 digital stream on a digital recording medium, the digital

4 recording apparatus comprising:

5   obtaining means for obtaining, during a recording, an

6 instruction to perform a predetermined procedure in which a

7 recording area for the recording has to be changed from a first

8 recording area to a second recording area which is not

9 necessarily continuous to the first recording area; and

10   execution control means for, in case that the obtaining

11 means obtains the instruction and when the number of frames

12 which are recorded in the first recording area is a

13 predetermined number or more,

14   (1) executing the predetermined procedure, and

15   (2) allowing the recording area to be changed from the

16   first recording area to the second recording area

17   after the execution of the procedure.

1 2.   The digital recording apparatus of Claim 1,

2   wherein the execution control means includes:

3   execution permitting means for, when the obtaining means

4 obtains the instruction,

5   (1) immediately permitting the execution of the

6   predetermined procedure, in case that the number of

7   the frames which are recorded in the first recording

8   area is the predetermined number or more, and

9   (2)   waiting for the number to increase to the

10   predetermined number or more and then permitting the

11   execution of the predetermined procedure, in case

12   that the number is less than the predetermined

13   number;

14   execution means for executing the predetermined

15   procedure when the execution permitting means permits the

16   execution; and

17   recording area changing means for allowing recording on

18   the first recording area to stop before the execution of the

19   predetermined procedure and allowing recording on the second

20   recording area to start after the execution of the procedure.

1   3.   The digital recording apparatus of Claim 2,

2   wherein the digital recording apparatus records the

3   digital stream as one object or partitions the digital stream

4   into a plurality of objects and records the partitioned objects,

5   each of the objects is recorded on a continuous recording

6   area on the digital recording medium, the continuous recording

7   area is not necessarily continuous with the other recording

8   areas,

9   the obtaining means obtains an instruction for a

10   predetermined procedure in which an object has to be partitioned

11   concurrently with the execution of the procedure, and

12   the recording area changing means for allowing a first

13   object being recorded in the first recording area to be

14   completed before the execution of the predetermined procedure

36

15   and allowing a second object to be recorded on the second

16   recording area after the execution of the predetermined

17   procedure.

1   4.   The digital recording apparatus of Claim 3,

2   wherein a video resolution is specified for each frame,

3   all frames included in one object must be a same video

4   resolution, and

5   the instruction includes an instruction that a video

6   resolution of a frame is changed from a first video resolution

7   to a second video resolution during recording,

8   wherein the digital recording apparatus further

9   includes:

10   video resolution recording means for

11   (1)   recording information on the first video resolution

12   that is specified for all frames included in the first

13   object before the execution of the predetermined

14   procedure, and

15   (2)   recording information on the second video resolution

16   that is specified for all frames included in the

17   second object after the execution of the procedure.

1   5.   The digital recording apparatus of Claim 4,

2   wherein it takes a certain amount of time for a

3   reproduction head of a reproduction apparatus to seek an object

4   from another object, when the two objects are continuously

5   reproduced using the reproduction apparatus and are not

6   continuous with each other on the digital recording medium, and

7   the predetermined number specified by the execution

8   control means is not less than a number that is necessary for

9   realizing a seamless reproduction without being influenced by

10 the expected maximum seeking time.

1   6.   The digital recording apparatus of Claim 5,

2   wherein the digital recording medium is a writable

3   DVD-disk,

4   the digital recording apparatus is a DVD recording

5   apparatus that records a digital video stream on the writable

6   DVD-disk, and

7   the object is a VOB conforming to the DVD-VideoRecording

8   standard.

1   7.   The digital recording apparatus of Claim 4 further

2   comprising:

3   resolution decision means for

4   (1) detecting a value of a high frequency component of the

5   frame,

6   (2) deciding a video resolution in accordance with the

7   value, and

8   (3) in case that the video resolution should be changed,

9   giving the obtaining means an instruction to change

10   the video resolution as the instruction;

11   wherein the execution means changes a video resolution

12 to the video resolution decided by the resolution decision means,

13   when the execution permitting means permits the execution of

14   the procedure.

1   8.   The digital recording apparatus of Claim 3,

2   wherein the obtaining means includes:

3   receiving means for receiving an instruction for a

4   procedure during recording; and

5   discrimination means for discriminating whether the

6   instruction received by the receiving means is an instruction

7   for the predetermined procedure or an instruction for the other

8   procedures,

9   wherein recording times of all frames included in a same

10   object are continuous,

11   the predetermined procedure includes a recording pause,

12   and

13   the other procedures include cancellation of the

14   recording pause,

15   wherein, when the discrimination means recognizes that

16   the receiving means has received the instruction for the

17   recording pause, the execution permitting means

18   (1)   immediately permits the execution of the recording

19   pause, in case that the number of frames included

20   in the first object is the predetermined number or

21   more, and

22   (2)   waits for the number to increase to the predetermined

23   number or more and then permits the execution of the

24   recording pause, in case that the number is less than

25   the predetermined number,

26   the execution means

27   (1) allows recording to pause and makes the apparatus

28   a standby mode, when the execution permitting means

29   permits the execution of the recording pause, and

30   (2) allows recording to be resumed, when the

31   discrimination means recognizes that the receiving

32   means has received the instruction for the

33   cancellation of the recording pause during the

34   standby mode, and

35   the recording area changing means allows the first object

36 being recorded on the first recording area to be completed

37 before the execution of the recording pause by the execution

38 means and allows the second object to be recorded on the second

39 recording area after the execution means allows the resumption

40 of recording.

1 9.   The digital recording apparatus of Claim 8,

2   wherein it takes a certain amount of time for a

3 reproduction head of a reproduction apparatus to seek an object

4 from another object, when the two objects are continuously

5 reproduced using the reproduction apparatus and are not

6 continuous with each other on the digital recording medium, and

7   the predetermined number specified by the execution

8 control means is not less than a number that is necessary for

9 realizing a seamless reproduction without being influenced by

10 the expected maximum seeking time.

40

1   10.   The digital recording apparatus of Claim 9,

2   wherein the digital recording medium is a writable

3   DVD-disk,

4   the digital recording apparatus is a DVD recording

5   apparatus that records a digital video stream on the writable

6   DVD-disk, and

7   the object is a VOB conforming to the DVD-VideoRecording

8   standard.

1   11.   A digital recording program that has a computer obtain

2   a digital stream including of a plurality of frames, while

3   recording the digital stream on a digital recording medium,

4   the program having the computer conduct the steps of:

5   (a)   an obtaining step for obtaining, during a recording,

6   an instruction to perform a predetermined procedure

7   in which a recording area for the recording is

8   changed from a first recording area to a second

9   recording area which is not necessarily continuous

10   to the first recording area; and

11   (b)   an execution control step for, in case that the

12   instruction is obtained in the obtaining step and

13   when the number of frames which are recorded in the

14   first recording area is a predetermined number or

15   more,

16   (1) executing the predetermined procedure, and

17   (2) allowing the recording area to be changed from

41

18   the first recording area to the second recording

19   area after the execution of the procedure.

1   12.   The digital recording program of Claim 11,

2   wherein the execution control step includes the sub steps

3   of:

4   an execution permitting sub step for, when the obtaining

5   step obtains the instruction,

6   (1)   immediately permitting the execution of the

7   predetermined procedure, in case that the number of

8   frames which are recorded in the first recording area

9   is the predetermined number or more, and

10   (2)   waiting for the number to increase to the

11   predetermined number or more and then permitting the

12   execution of the predetermined procedure, in case

13   that the number is less than the predetermined

14   number;

15   an execution sub step for executing the predetermined

16   procedure when the execution permitting sub step permits the

17   execution; and

18   a recording area changing sub step for allowing recording

19   on the first recording area to stop before the execution of the

20   predetermined procedure and allowing recording on the second

21   recording area to start after the execution of the procedure.

1   13.   The digital recording program of Claim 12,

2   wherein the digital recording program has the computer

3   record the digital stream as one object or partition the digital

4   stream into a plurality of objects and record the partitioned

5   objects,

6   each of the objects is recorded on a continuous recording

7   area on the digital recording medium, the continuous recording

8   area is not necessarily continuous with the other recording

9   areas,

10   the obtaining step obtains an instruction for a

11   predetermined procedure in which an object is partitioned

12   concurrently with the execution of the procedure, and

13   the recording area changing sub step for allowing a first

14   object being recorded in the first recording area to be

15   completed before the execution of the predetermined procedure

16   and allowing a second object to be recorded on the second

17   recording area after the execution of the predetermined

18   procedure.

1   14.   The digital recording program of Claim 13,

2   wherein a video resolution is specified for each frame,

3   all frames included in one object must be a same video

4   resolution, and

5   the instruction includes an instruction that a video

6   resolution of a frame is changed from a first video resolution

7   to a second video resolution during recording,

8   wherein the digital recording program has the computer

9   conduct the further step of:

10   a video resolution recording step for

43

11   (1)   recording information on the first video resolution

12   that is specified for all frames included in the first

13   object before the execution of the predetermined

14   procedure, and

15   (2)   recording information on the second video resolution

16   that is specified for all frames included in the

17   second object after the execution of the procedure.

1   15.   The digital recording program of Claim 14 and having the

2 computer conduct the further step of:,

3   a resolution decision step for

4   (1) detecting a value of a high frequency component of the

5   frame,

6   (2) deciding a video resolution in accordance with the

7   value, and

8   (3) in case that the video resolution should be changed,

9   giving an instruction to change the video resolution

10   in the obtaining step as the instruction;

11   wherein, in the execution sub step, a video resolution

12 is changed to the video resolution decided in the resolution

13 decision step, when the execution of the procedure is permitted

14 in the execution permitting sub step.

1   16.   A digital recording method for obtaining a digital stream

2 consisting of a plurality of frames, while recording the digital

3 stream on a digital recording medium,

4   the digital recording method comprising the steps of:

5 (a) an obtaining step for obtaining, during a recording,

6   an instruction to perform a predetermined procedure

7   in which a recording area for the recording is

8   changed from a first recording area to a second

9   recording area which is not necessarily continuous

10   to the first recording area; and

11 (b) an execution control step for, in case that the

12   instruction is obtained in the obtaining step and

13   when the number of frames which are recorded in the

14   first recording area is a predetermined number or

15   more,

16   (1) executing the predetermined procedure, and

17   (2) allowing the recording area to be changed from

18   the first recording area to the second recording

19   area after the execution of the procedure.

1 17. The digital recording method of Claim 16,

2   wherein the execution control step includes the sub steps

3 of:

4   an execution permitting sub step for, when the obtaining

5 step obtains the instruction,

6   (1) immediately permitting the execution of the

7   predetermined procedure, in case that the number of

8   frames which are recorded in the first recording area

9   is the predetermined number or more, and

10   (2) waiting for the number to increase to the

11   predetermined number or more and then permitting the

45

12   execution of the predetermined procedure, in case

13   that the number is less than the predetermined

14   number;

15   an execution sub step for executing the predetermined

16 procedure when the execution permitting sub step permits the

17 execution; and

18   a recording area changing sub step for allowing recording

19 on the first recording area to stop before the execution of the

20 predetermined procedure and allowing recording on the second

21 recording area to start after the execution of the procedure.

1 18.   The digital recording method of Claim 17,

2   wherein the digital stream is recorded as one object or

3 the digital stream is partitioned into a plurality of objects

4 and the partitioned objects are recorded,

5   each of the objects is recorded on a continuous recording

6 area on the digital recording medium, the continuous recording

7 area is not necessarily continuous with the other recording

8 areas,

9   the obtaining step obtains an instruction for a

10 predetermined procedure in which an object is partitioned

11 concurrently with the execution of the procedure, and

12   the recording area changing sub step for allowing a first

13 object being recorded in the first recording area to be

14 completed before the execution of the predetermined procedure

15 and allowing a second object to be recorded on the second

16 recording area after the execution of the predetermined

17 procedure.

1 19. The digital recording method of Claim 18,

2   wherein a video resolution is specified for each frame,

3   all frames included in one object must be a same video

4 resolution, and

5   the instruction includes an instruction that a video

6 resolution of a frame is changed from a first video resolution

7 to a second video resolution during recording,

8   wherein the digital recording method further includes the

9 step of:

10   a video resolution recording step for

11   (1) recording information on the first video resolution

12   that is specified for all frames included in the first

13   object before the execution of the predetermined

14   procedure, and

15   (2) recording information on the second video resolution

16   that is specified for all frames included in the

17   second object after the execution of the procedure.

1 20. The digital recording method of Claim 19 and comprising

2   the further step of:

3   a resolution decision step for

4   (1) detecting a value of a high frequency component of the

5   frame,

6   (2) deciding a video resolution in accordance with the

7   value, and

8   (3) in case that the video resolution should be changed,

9   giving an instruction to change the video resolution

10   in the obtaining step as the instruction;

11   wherein, in the execution sub step, a video resolution

12 is changed to the video resolution decided in the resolution

13 decision step, when the execution of the procedure is permitted

14 in the execution permitting sub step.